Hydrogen Recovery System, Phase II

Completed Technology Project (2011 - 2014)

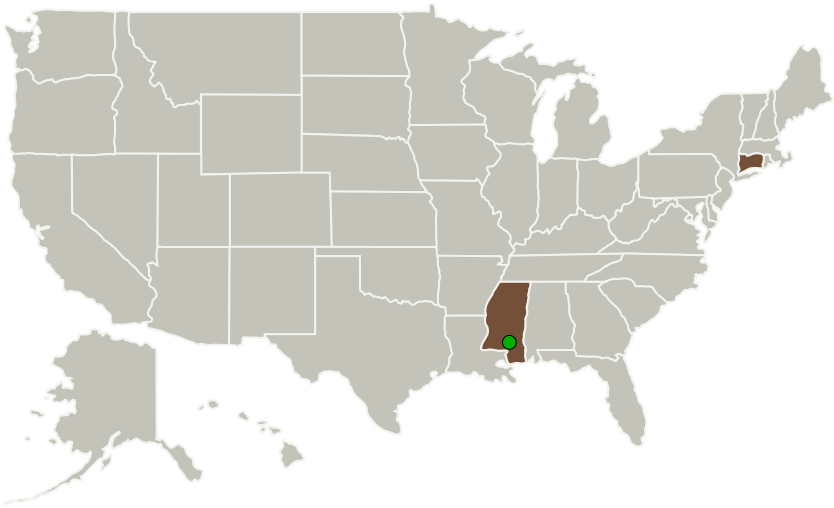
Project Introduction

Rocket test operations at NASA Stennis Space Center (SSC) result in substantial quantities of hydrogen gas that is flared from the facility and helium gas that is vented. One way to save on the cost of test operations is to recover these gases using an electrochemical system. This Hydrogen Recovery System (HRS) selectively removes hydrogen from the mixed stream, leaving behind high-value helium. The system then removes residual water vapor from this helium and compresses it to commercial storage pressure. The heart of the HRS is a system platform under commercial development by Sustainable Innovations, termed H2RENEW

TM

, an electrochemical system package that separates and compresses hydrogen using Proton Exchange Membrane (PEM) technology. The system being developed in this Phase II STTR program targets a hydrogen removal rate of 1.77 scfm, an outlet hydrogen pressure of 200 psi, and a product helium pressure of 2,000 ⬌ 2,500 psi. This system leverages a robust novel Expandable Modular Architecture (EMA) electrochemical cell stack that is capable of being constructed with a very large production capacity and high operating pressure.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Sustainable Innovations, LLC	Lead Organization	Industry	East Hartford, Connecticut
Skyre Inc	Supporting Organization	Industry Small Disadvantaged Business (SDB)	
Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi
University of Connecticut	Supporting Organization	Academia	Storrs, Connecticut

Primary U.S. Work Locations	
Connecticut	Mississippi

Project Transitions

July 2011: Project Start

September 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138966)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Sustainable Innovations, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Trent Molter

Co-Investigator:

Trent Molter

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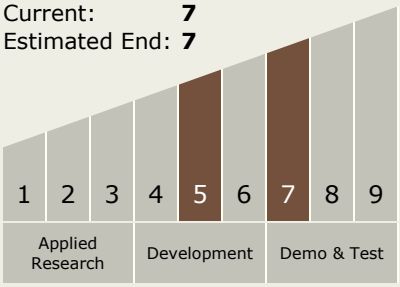
Technology Maturity (TRL)

Start: **5**
Current: **7**
Estimated End: **7**



Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
  - TX13.1 Infrastructure Optimization
    - TX13.1.3 Commodity Recovery

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System